removing said unreacted titanium disilicide to complete formation of said titanium disilicide film in the manufacture of said integrated circuit.

18. (AMENDED) The method according to Claim 15 wherein said laser annealing uses a laser having a wavelength of 1.06 nm and energy between about 0.5 and 1.5 Joules/cm^2.

19. (AMENDED) The method according to Claim 15 wherein said laser annealing uses an Excimer laser having a wavelength of 248 nm and energy between about 0.1 and 1.2 Joules/cm^2.

REMARKS

Examiner J. Maldonado is thanked for the thorough examination and search of the subject Patent Application. Claims 1, 4, 5, 15, 18, and 19 have been amended.

All Claims are believed to be in condition for Allowance and that is so requested.

It is requested that should the Examiner not find that the Claims are allowable, that he enter the Amendment for purposes of Appeal.

Reconsideration of the rejection under 35 U.S.C. 102 of Claims 1, 2, 6, 7, 15, 16, 20, and 21 as being anticipated by Mouroux is requested in view of Amended Claims 1, 4, 5, 15, 18, and 19 and in accordance with the following remarks.

It is agreed that Mouroux teaches a method of forming C40 and then C54 titanium silicide, including depositing titanium directly over the silicon regions as shown in Fig. 9. However, Mouroux requires the presence of a refractory metal such as Mo to form the C40 phase. This can be in the form of a refractory metal layer underlying the titanium, refractory metal implanted into the silicon regions, or an alloy of a refractory metal with the titanium. Applicants' detailed Claimed invention does not use a refractory metal in forming the C40 phase $TiSi_2$. It is the laser annealing that forms the C40 phase in Applicants' claimed invention. Claims 1 and 15 have been amended to claim the laser annealing of their respective dependent claims 4-5 and 18-19. This clearly differentiates the claims over Mouroux since Mouroux does not teach laser annealing.

Reconsideration of the rejection under 35 U.S.C. 102 of Claims 1, 2, 6, 7, 15, 16, 20, and 21 as being anticipated by Mouroux is requested in view of Amended Claims 1, 4, 5, 15, 18, and 19 and in accordance with the remarks above.

Reconsideration of the rejection under 35 U.S.C. 103 of Claims 3 and 7 as being unpatentable over Mouroux is requested in view of Amended Claim 1 and in accordance with the following remarks.

On page 15 where Mouroux discusses the thickness of the titanium layer, she states that a refractory metal layer is "introduced as a thin interposed layer ... between the Si and substrate and the Ti films." Thus, the titanium layer is not deposited "directly overlying said silicon regions to be silicided" as claimed in Applicants' Claim 1. Furthermore, Claim 1 has been amended to claim the laser annealing claimed in dependent Claims 4 and 5. Laser annealing is not taught or suggested by Mouroux since Mouroux requires the presence of a refractory metal to form the C40 phase $TiSi_2$.

Reconsideration of the rejection under 35 U.S.C. 103 of Claims 3 and 7 as being unpatentable over Mouroux is requested in view of Amended Claim 1 and in accordance with the remarks above.

Reconsideration of the rejection under 35 U.S.C. 103 of Claims 4, 5, 8-14, 18, and 19 as being unpatentable over Mouroux in view of Ishida is requested in view of Amended Claims 1, 4, 5, 15, 18, and 19 and in accordance with the following remarks.

Ishida was cited in the background section of the Specification. Ishida teaches laser annealing to form C49 phase $TiSi_2$ (col. 4, lines 5-18). Laser annealing is not taught or suggested in Mouroux. Mouroux teaches forming C54 $TiSi_2$ by first forming a C40 phase silicide layer incorporating a refractory metal (see, for example, the summary on page 40). There would be no motivation to combine the laser annealing of Ishida which forms phase C49 silicide with Mouroux which forms phase C40 silicide. Neither reference has an understanding of the possibility of forming phase C40 silicide using laser annealing. Thus, it is not agreed that Applicants' claimed invention is obvious in view of the combination of references.

Reconsideration of the rejection under 35 U.S.C. 103 of Claims 4, 5, 8-14, 18, and 19 as being unpatentable over Mouroux in view of Ishida is requested in view of Amended Claims 1 and 15 and in accordance with the remarks above.

Allowance of all Claims is requested.

Attached hereto is a marked-up version of the changes made to the Claims by the current amendment. The attached pages are captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

It is requested that should Examiner Maldonado not find that the Claims are now Allowable that he call the undersigned at 765 4530866 to overcome any problems preventing allowance.

Respectfully submitted,

Rosemary L. S. Pike. Reg # 39,332

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Please amend the Claims as follows:

1. (TWICE AMENDED) A method of fabricating a titanium disilicide film in the manufacture of an integrated circuit comprising:

providing a semiconductor substrate having silicon regions to be silicided;

depositing a titanium layer directly overlying said silicon regions to be silicided;

subjecting said substrate to a [first] laser annealing whereby said titanium is transformed to phase C40 titanium disilicide where it overlies said silicon regions and wherein said titanium not overlying said silicon regions is unreacted;

subjecting said substrate to a second annealing whereby phase C54 titanium disilicide is grown overlying said phase C40 titanium disilicide and whereby said phase C40 titanium disilicide is transformed to phase C54 titanium disilicide; and

removing said unreacted titanium layer to complete formation of said titanium disilicide film in the

manufacture of said integrated circuit.

4. (AMENDED) The method according to Claim 1 wherein said [first annealing is a] laser annealing [using] uses a laser having a wavelength of 1.06 nm and energy between about 0.5 and 1.5 Joules/cm^2.

5. (AMENDED) The method according to Claim 1 wherein said [first annealing is a] laser annealing [using] uses an Excimer laser having a wavelength of 248 nm and energy between about 0.1 and 1.2 Joules/cm^2.

15. (TWICE AMENDED) A method of fabricating a titanium disilicide film in the manufacture of an integrated circuit comprising:

providing a semiconductor substrate having silicon regions to be silicided;

depositing a titanium layer directly overlying said silicon regions to be silicided;

subjecting said substrate to a [first] laser annealing whereby said titanium is transformed to phase C40 titanium disilicide where it overlies said silicon regions and wherein said titanium not overlying said silicon regions is unreacted;

subjecting said substrate to a second annealing at

a temperature of less than 700 ^{O}C whereby said phase C40 titanium disilicide is transformed to phase C54 titanium disilicide; and

removing said unreacted titanium disilicide to complete formation of said titanium disilicide film in the manufacture of said integrated circuit.

18. (AMENDED) The method according to Claim 15 wherein said [first annealing is a] laser annealing [using] uses a laser having a wavelength of 1.06 nm and energy between about 0.5 and 1.5 Joules/cm^2.

19. (AMENDED) The method according to Claim 15 wherein said [first annealing is a] laser annealing [using] uses an Excimer laser having a wavelength of 248 nm and energy between about 0.1 and 1.2 Joules/cm^2.